Fig.1.

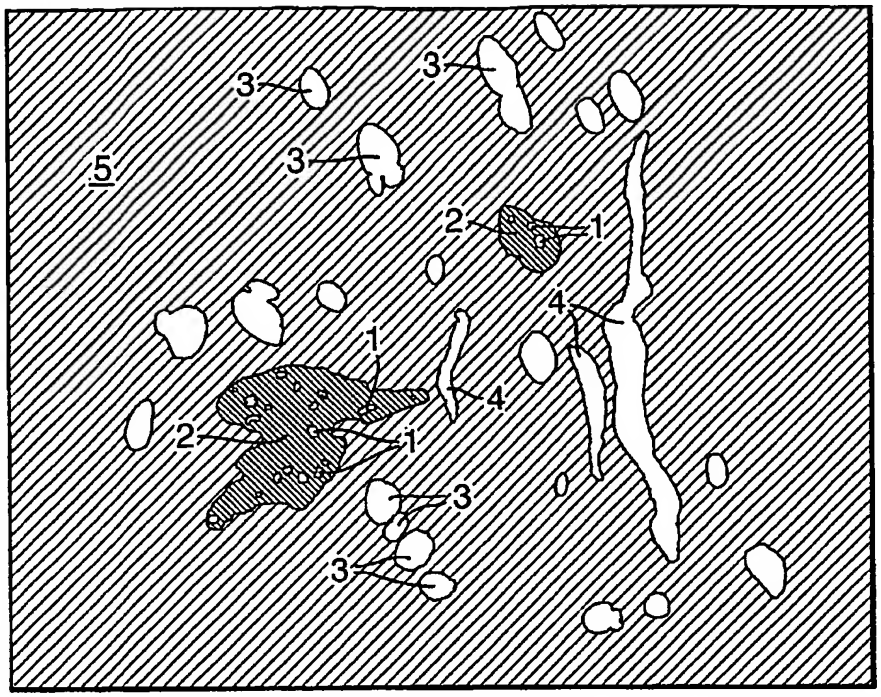
3
3
3
5
2
1
4
1
4
2
1
3
3

Fig.2.

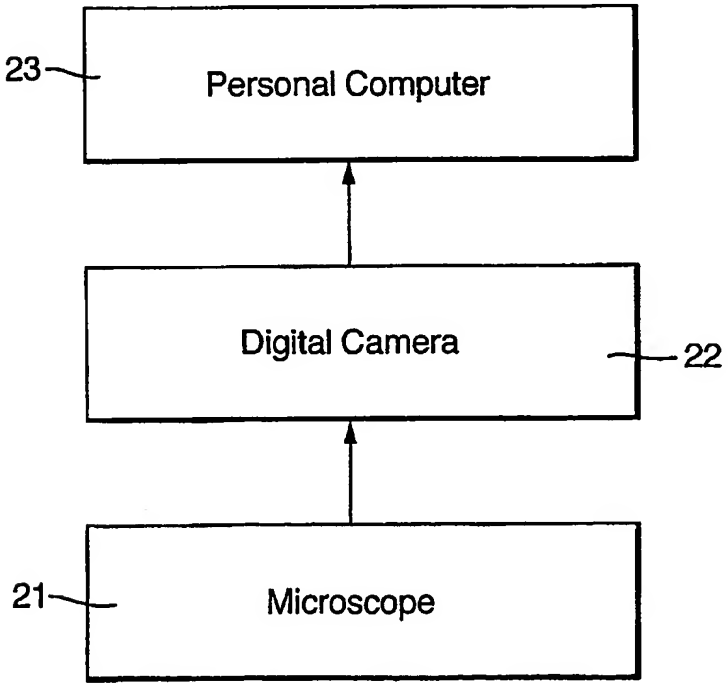
23
Personal Computer
Digital Camera
22
21
Microscope

Fig.3.

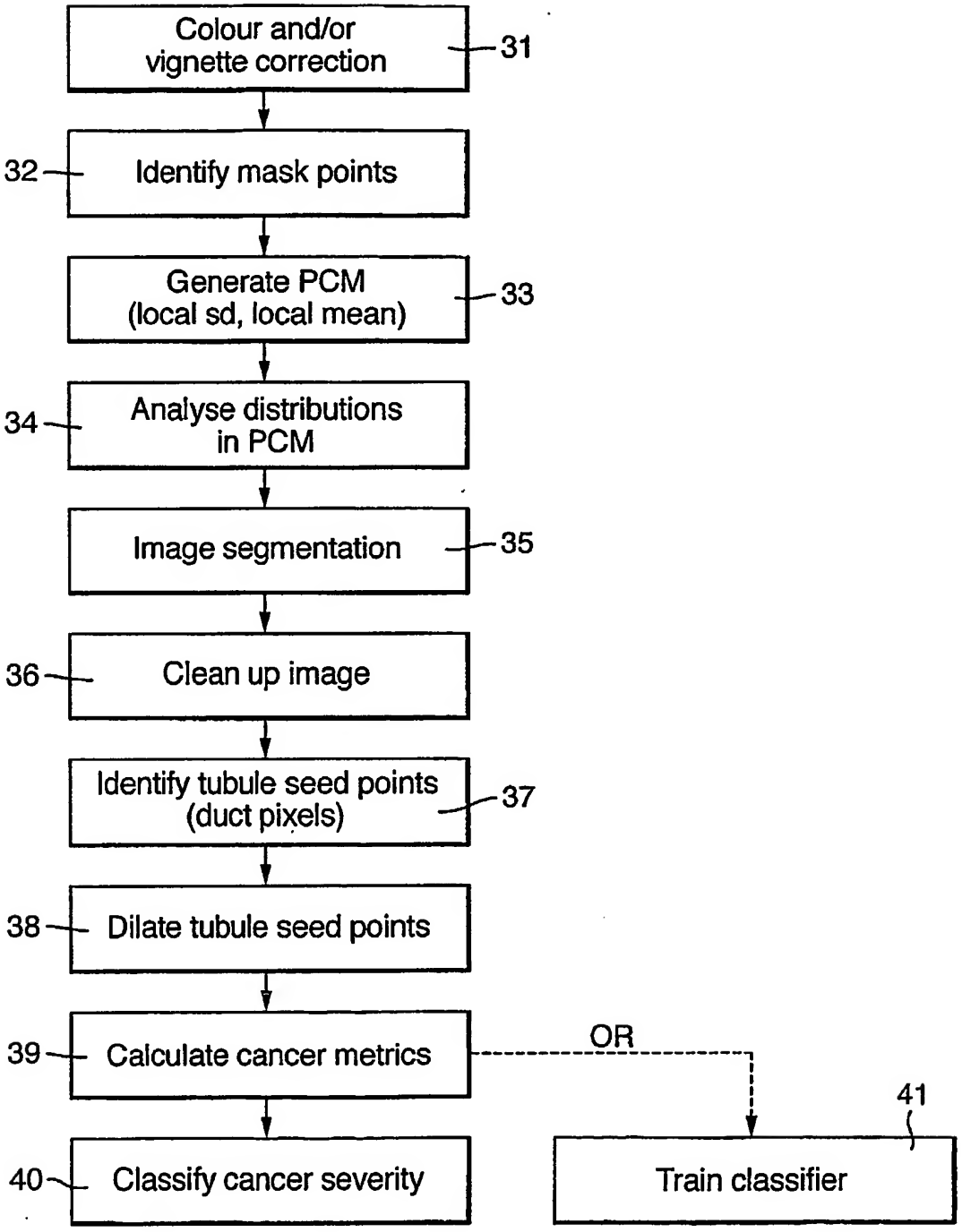
Colour and/or vignette correction
31
32
Identify mask points
Generate PCM (local sd, local mean)
33
34
Analyse distributions in PCM
Image segmentation
35
36
Clean up image
Identify tubule seed points (duct pixels)
37
38
Dilate tubule seed points
39
Calculate cancer metrics
OR
41
40
Classify cancer severity
Train classifier

Fig.4.

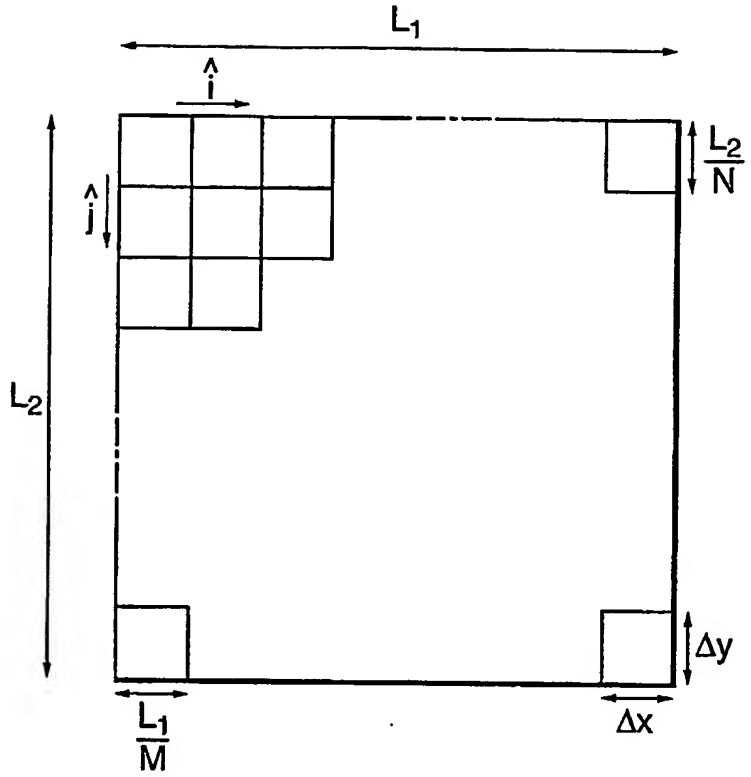

Fig.5.

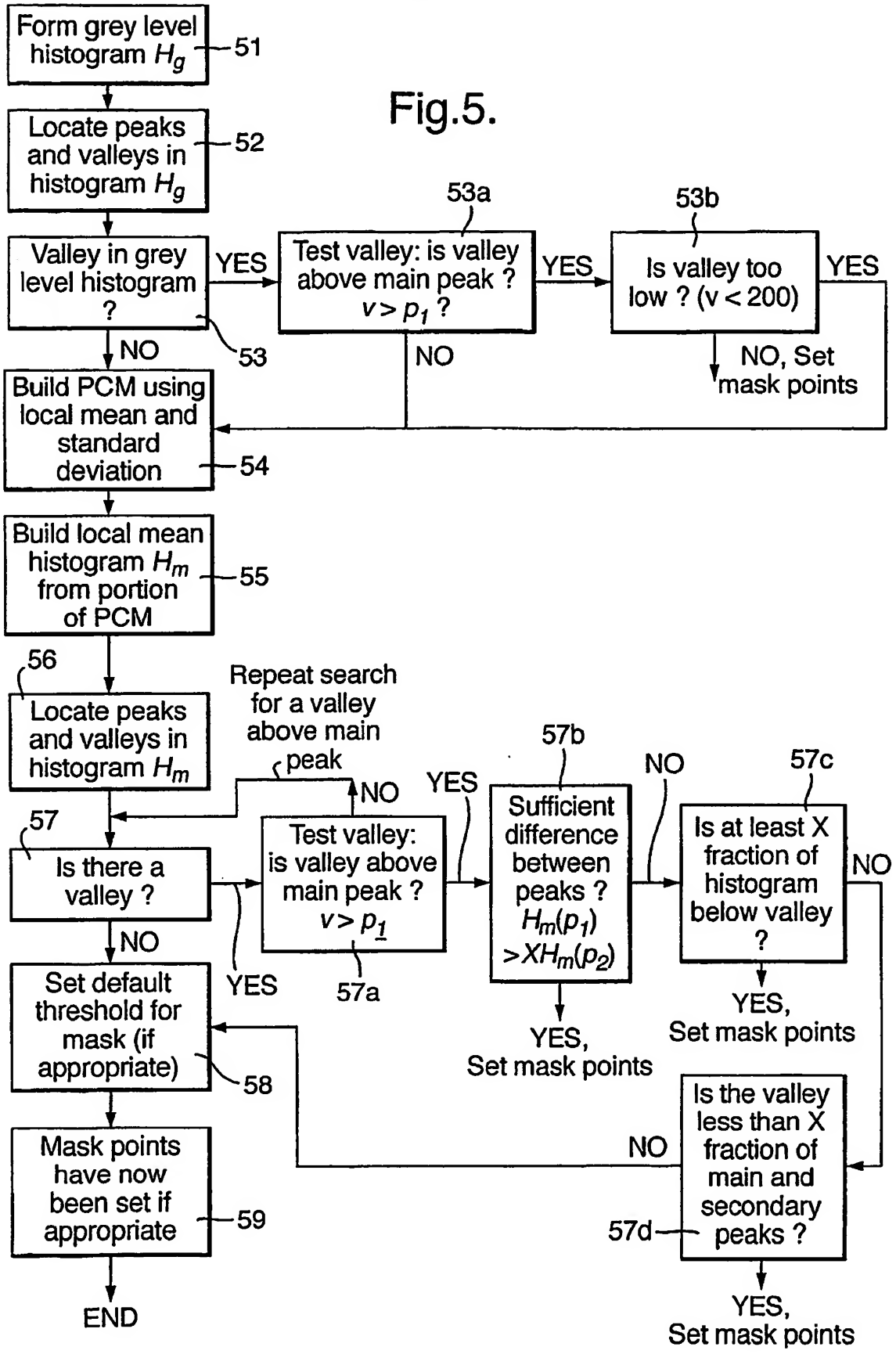
Form grey level histogram H_g
51
Locate peaks and valleys in histogram H_g
52
Valley in grey level histogram ?
YES
NO
53
53a
Test valley: is valley above main peak ? $v > p_1$?
YES
NO
53b
Is valley too low ? (v < 200)
YES
NO, Set mask points
Build PCM using local mean and standard deviation
54
Build local mean histogram H_m from portion of PCM
55
56
Locate peaks and valleys in histogram H_m
Repeat search for a valley above main peak
NO
57
Is there a valley ?
YES
NO
Test valley: is valley above main peak ? $v > p_1$
57a
YES
57b
Sufficient difference between peaks ? $H_m(p_1) > XH_m(p_2)$
NO
YES, Set mask points
57c
Is at least X fraction of histogram below valley ?
NO
YES, Set mask points
Set default threshold for mask (if appropriate)
58
Mask points have now been set if appropriate
59
END
NO
Is the valley less than X fraction of main and secondary peaks ?
57d
YES, Set mask points

Fig.6(a)

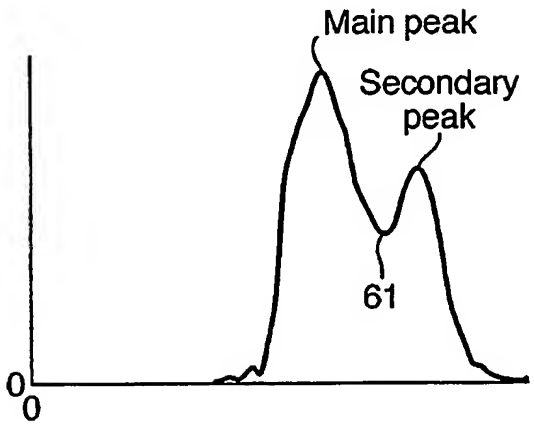

Fig.6(b)

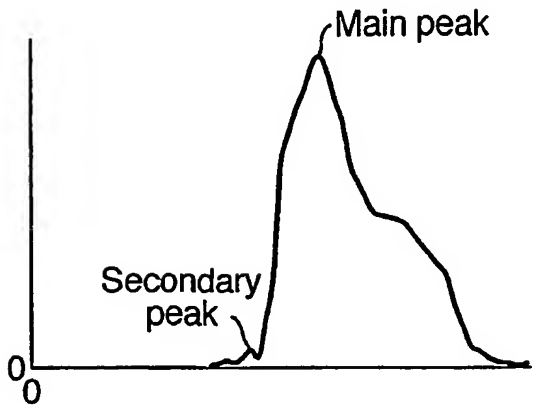

Fig.7.

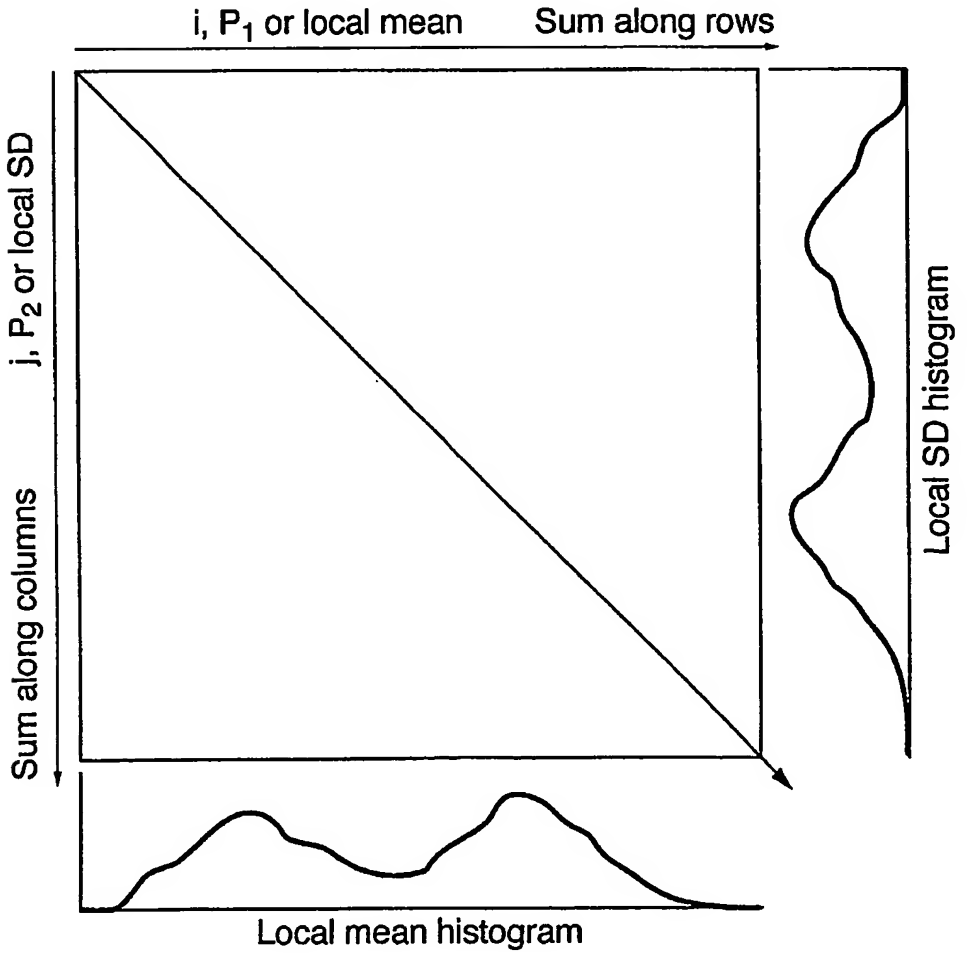

Fig.8.

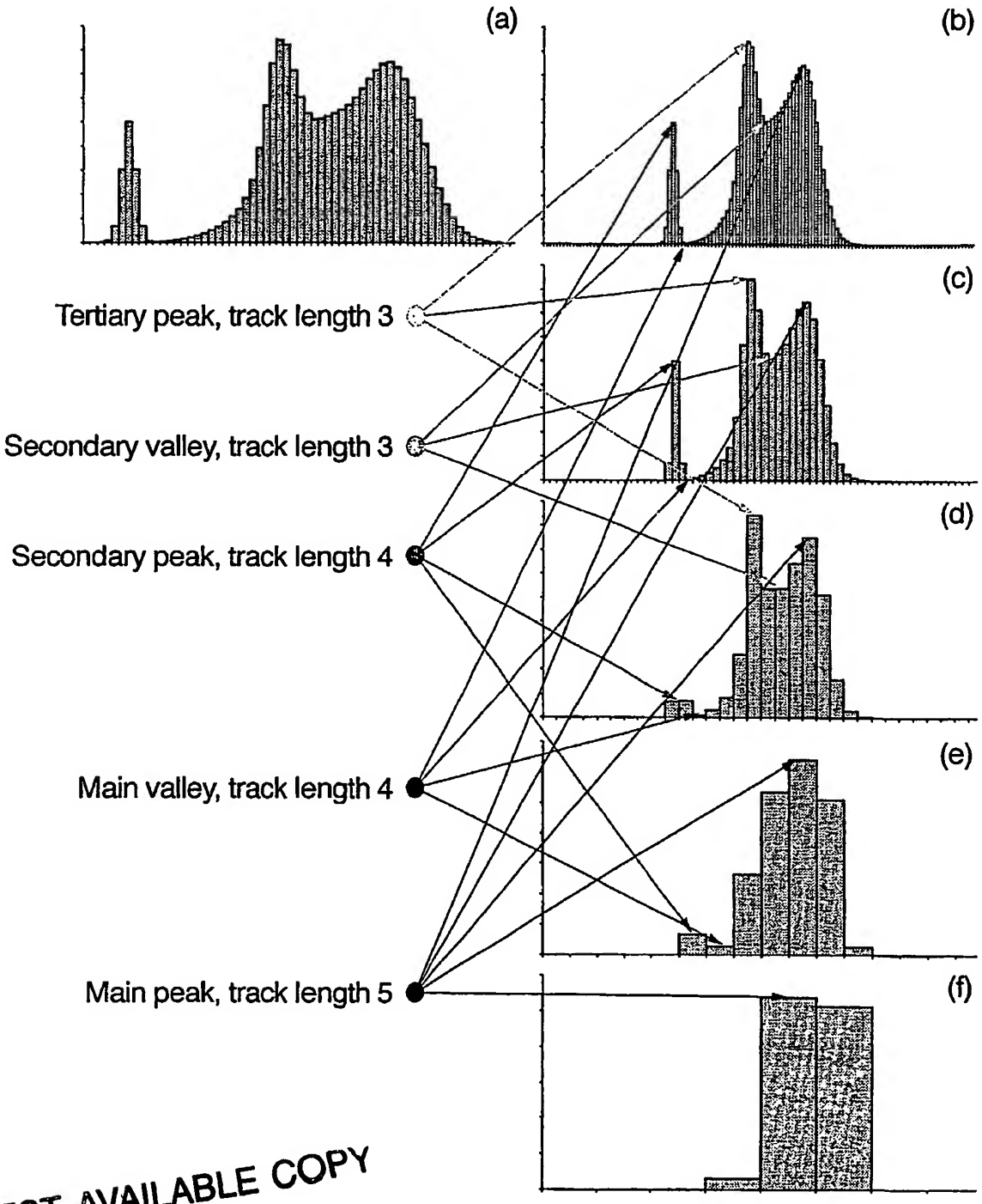

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Fig.9.

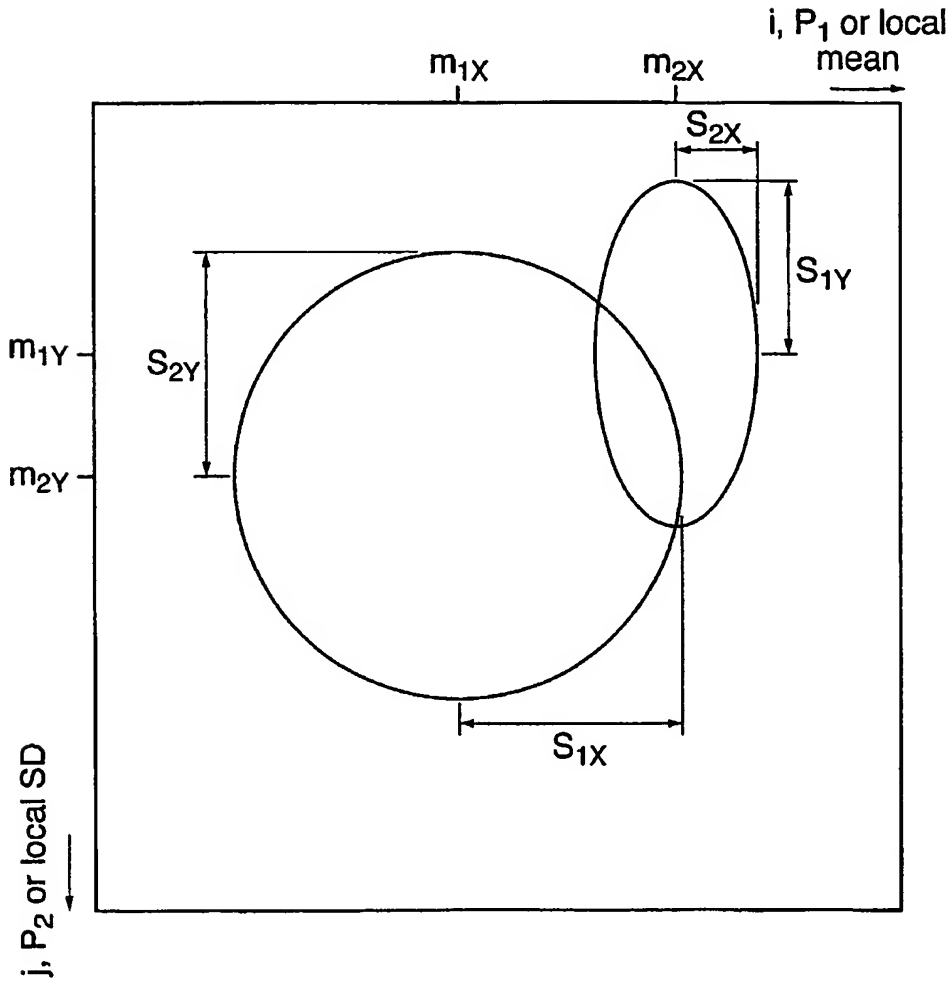
i, P_1 or local mean
m_{1X}
m_{2X}
S_{2X}
S_{1Y}
m_{1Y}
S_{2Y}
m_{2Y}
S_{1X}
j, P_2 or local SD

Fig.10.

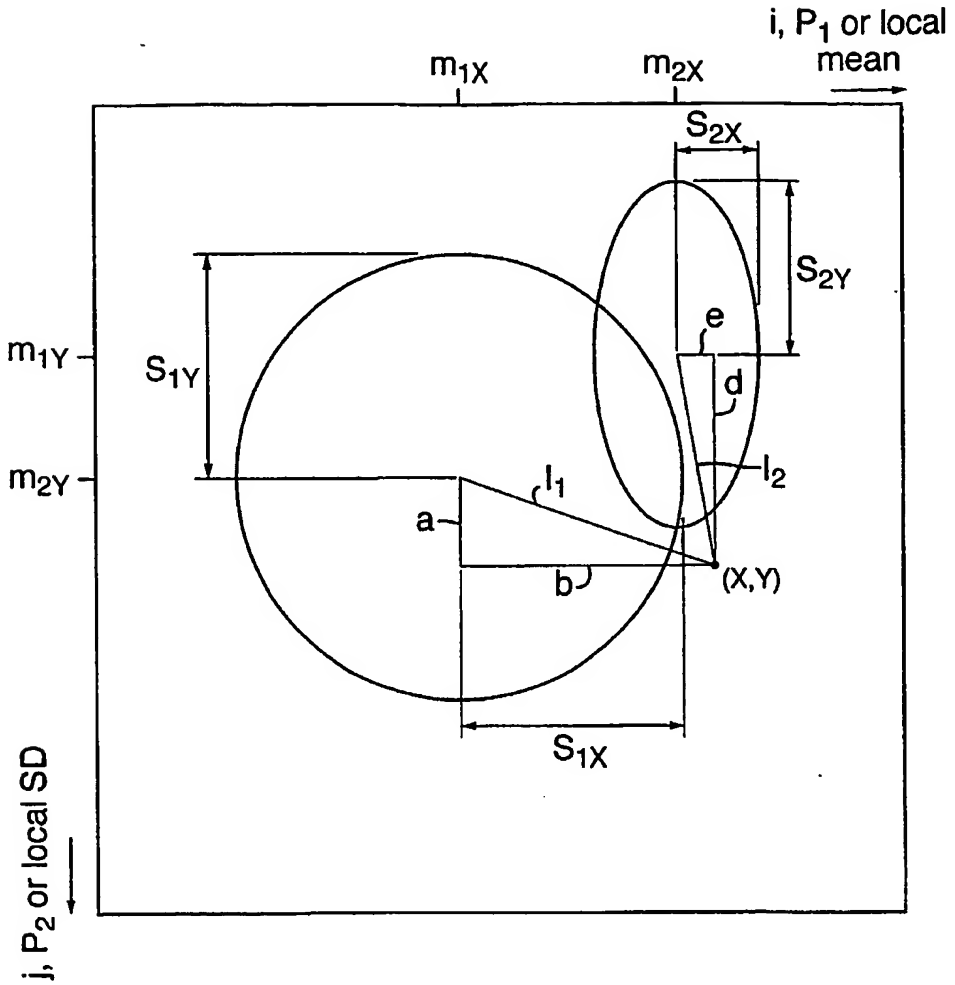

Fig.11.

a	b	c
d	X	e
f	g	h

Fig.12.

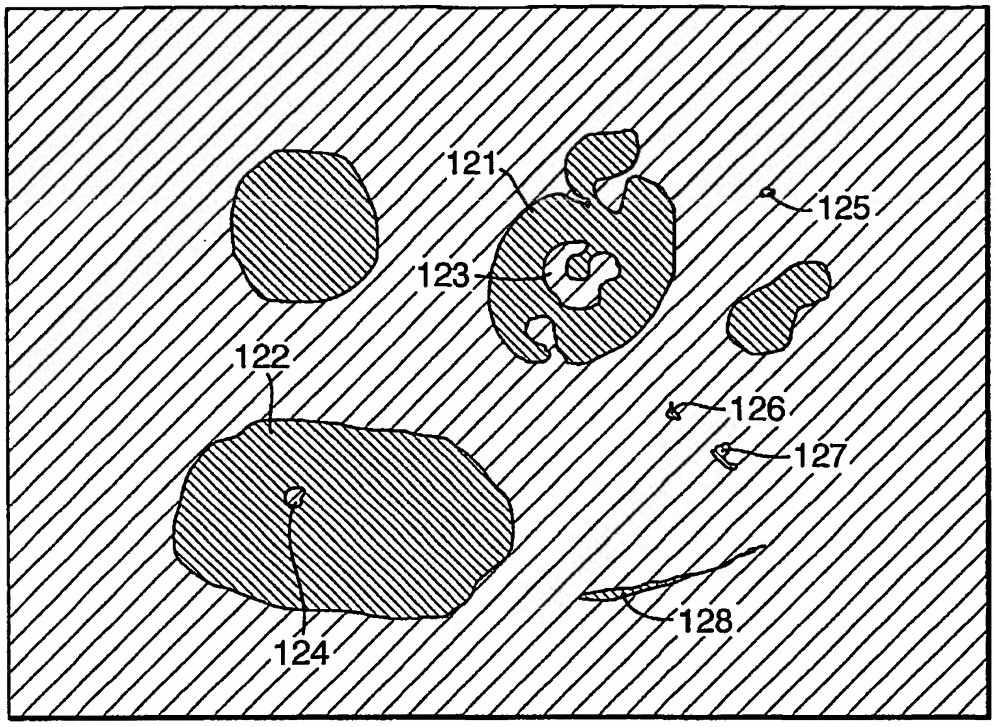

Fig.13(a)

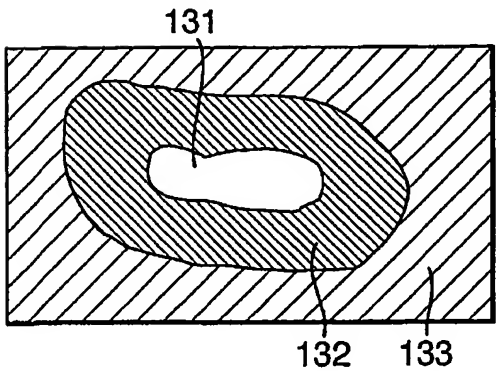
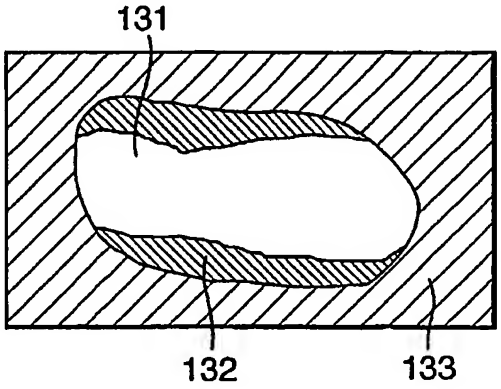
Fig.13(b)